Epidemiological characteristics and modelling for short-term prediction of the Respiratory Syncytial Virus (RSV) and Influenza spreading in Catalonia (Spain)

Aida Perramon¹, Víctor López¹, Martí Catalá², Sergio Alonso¹, Enric Álvarez¹, Clara Prats¹ and Daniel López¹

¹Physics Department, Universitat Politècnica de Catalunya. Castelldefels, Catalonia, Spain.
²Center for Statistics in Medicine, Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford, UK

Introduction

New and unknown dynamics

Very severe illness in children <2 years.
Saturation of hospitals!!!

We had yearly seasonal outbreaks of Influenza and RSV until SARS-CoV-2!

Methods

AIM → Characterize RSV and influenza epidemics in Catalonia to analyse the changes caused by SARS-CoV-2!

Adjusting mathematical models!

DATA: from public databases such as DIAGNOSTICAT and SIVIC, combined with ad-hoc data obtained in the context of a multicentric project that includes paediatricians from tertiary hospitals and primary care settings (COPEDI-CAT).

Mathematical modelling: Gompertz model for RSV and SEIR-like model for RSV and Influenza. Meteorological factors incorporated in the SEIR meteomodel for Influenza. We tested the models for short- and mid-term predictive purposes.

Results

Gompertz adjustment to cumulative RSV infections detected at hospitals of Catalonia from 2013 to 2022. Adjustment to epidemic peak.

SEIR-like

SEIR adjustment to RSV infections detected at hospitals of Catalonia from 2013 to 2022. Adjustment to epidemic peak. 2-steps transmissivity function to consider changes of slope.

Summary and conclusions

The Gompertz model properly describes RSV and Influenza epidemics

SEIR models are equally useful and give us further information about transmissivity

The predictive capability of the models is of 5 to 20 days in advance, which is satisfactory although we have room for improvement!

Climatic factors do influence influenza epidemics, but have a lower effect on RSV’s

We have to be cautious on interpreting these results, since climate may not drive the viral dynamics but social ones.

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